INDEX TO VOLUME 258

A

Accretion-gley and the gumbotil dilemma, J. C. Frye and others, 185.

Age determinations, and Rb-Sr analyses of certain lepidolites, L. F. Herzog, W. H. Pinson, Jr., and P. M. Hurley, 191.

Albite composition, temperature-pressure plane for, Francis Birch and Paul LeComte, 209.

Aluminum, Si-Al relation in clinopyroxenes from igneous rocks, Ikuo Kushiro, 548.

oxide, Mineralogical equilibria in the system K_2O–Al_2O_3–SiO_2–H_2O, J. J. Hemley (Communication), 153.

—, System CaO–Al_2O_3–SiO_2–H_2O, II. System $CaSiO_3$–H_2O, D. A. Buckner, D. M. Roy, and Rustum Roy, 132.

Amstutz, G. C., review by, 687.

Anatomy and morphology of American species of genus Psaronius, Jeanne Morgan (Review), 608.

Archaeologist, soils for, I. W. Cornwall (Review), 524.

Arenites, classification, K. A. W. Crook, 419.

Argon diffusion in glauconite, microcline, sanidine, leucite, and phlogopite, J. F. Evernden and others, 583.

Arntson, R. W., Dickson, F. W., and Tunell, George, Systems S–Na_2O–H_2O and S–H_2O: application to the mode of origin of natural alkaline polysulfide and thiosulfate solutions, 574.

Atmosphere, upper, H. S. W. Massey and R. L. F. Boyd (Review), 528.

Avalanches at Chaos Jumbles, Lassen Volcanic National Park, J. P. Heath, 744.

B

Ball, T. K., A petrofabric analysis of a fold, 274.

Battey, M. H., The relationship between preferred orientation of olivine in dunite and the tectonic environment, 716.

Berry, L. G., and Mason, Brian, Mineralogy (concepts, descriptions, determinations) (Review), 685.

Biostratigraphy, lower Tertiary, of California Coast ranges, V. S. Mallory (Review), 300.

Biotites, X-ray measurement of the iron-magnesium ratio, J. A. Gower (Communication), 298.

Birch, Francis, and LeComte, Paul, Temperature-pressure plane for albite composition, 209.

Bloom, A. L., review by, 526.

Bloxam, T. W., Jadeite-rocks and glaucophane-schists from Angel Island, San Francisco Bay, California, 555.

Bog, postglacial raised, Nova Scotia, recurrence surfaces and pollen stratigraphy, J. G. Ogden III, 341.

British West Indies, rate of clay formation and mineral alteration in a 4000-year-old volcanic ash soil on St. Vincent, R. L. Hay, 354.

Broecker, W. S., Ewing, Maurice, and Heezen, B. C., Evidence for an abrupt change in climate close to 11,000 years ago, 429.

Brown, S. C., Basic data of plasma physics (Review), 301.

Buckner, D. A., Roy, D. M., and Roy, Rustum, Studies in the system CaO–Al_2O_3–SiO_2–H_2O, II: The system $CaSiO_3$–H_2O, 132.

Buerger, M. J., Vector space and its application in crystal-structure analysis (Review), 298.

Butzer, K. W., Quaternary stratigraphy and climate in the Near East (Review), 222.

C

Cady, W. M., and Zen, E-an, Stratigraphic relationships of the Lower Ordovician Chipman formation in west-central Vermont, 728.

Cailleux, André, and Tricart, Jean, Cours de géomorphologie (Review), 158.

Calcium metasilicate, System CaO–Al_2O_3–SiO_2–H_2, II. System $CaSiO_3$–H_2O, D. A. Buckner, D. M. Roy, and Rustum Roy, 132.

oxide, System CaO–Al_2O_3–SiO_2–H_2O, II. System $CaSiO_3$–H_2O, D. A. Buckner, D. M. Roy, and Rustum Roy, 132.

California, charnockitic rocks of Santa Lucia Range, R. R. Compton, 609.

jadeite-rocks and glaucophane-schists from Angel Island, T. W. Bloxam, 555.

lawsonite and pumpellyite in glaucophane schist, North Berkeley Hills, G. A. Davis, 689.

northern, Pleistocene glaciation in Trinity Alps, R. P. Sharp, 305.

repeated avalanches at Chaos Jumbles, Lassen Volcanic National Park, J. P. Heath, 744.

Silurian strata of Klamath Mountains, Michael Churkin, Jr., and R. L. Langenheim, Jr., 258.

Canada, late-glacial and postglacial plant macrofossils from Gillis Lake, Richmond County, Nova Scotia, W. B. Schofield and H. Robinson, 518.

radiocarbon-dated organic sediment near Herbert, Saskatchewan, W. O. Kupsch, 282.
recurrence surfaces and pollen stratigraphy of a postglacial raised bog, Nova Scotia, J. G. Ogden III, 341.
Carbonates, stability at 25°C and one atmosphere total pressure, R. M. Garrels, M. E. Thompson, and R. Siever, 402.
Carboniferous, boundary between Lower and Upper, Japan, Masao Minato, 637.
Carlston, C. W., review by, 223.
Carr, M. H., review by, 80.
Change in climate close to 11,000 years ago, W. S. Broecker, Maurice Ewing, and B. C. Heezen, 429.
Charnockitic rocks of Santa Lucia Range, Calif., R. R. Compton, 609.
Chemistry of igneous rocks I. Differentiation index, C. P. Thornton and O. F. Tuttle, 664.
Christ, C. L., review by, 298.
Churkin, Michael, Jr., and Langenheim, R. L., Jr., Silurian strata of the Klamath Mountains, California, 258.
Classification of arenites, K. A. W. Crook, 419.
Clay formation and mineral alteration in a 4000-year-old ash soil, St. Vincent, B. W. I., R. L. Hay, 354.
Clays of Japan, mineralogical study, Toshio Sudo (Review), 687.
Climate, and Quaternary stratigraphy, in Near East, K. W. Butzer (Review), 222.
evidence for abrupt change close to 11,000 years ago, W. S. Broecker, Maurice Ewing, and B. C. Heezen, 429.
Clinopyroxenes from igneous rocks, Si-Al relation, Ikuo Kushiro, 548.
regressions of physical properties on composition, I. Lattice constants, Horace Winchell and Robert Tilling, 529.
Coastal and submarine morphology, André Guilcher (Review), 223.
Compositional characteristics and equilibrium relations in mineral assemblages of a metamorphose iron formation, R. F. Mueller, 449.
Compton, R. R., Charnockitic rocks of Santa Lucia Range, California, 609.
Connecticut, post-Harbor Hill-Charlestown moraine, Richard Goldsmith, 740.
preliminary geological map, explanatory text, John Rodgers (Review), 155.
Copper chloride, Occurrence of CuCl emission in volcanic flames, K. J. Murata, 769.
Cornwall, I. W., Soils for the archaeologist (Review), 524.
Cowgill, U. M., review by, 524.
Crook, K. A. W., Classification of arenites, 419.
Crystalline schists of central Japan, jadeite, Yotaro Seki, 705.
Crystallization, dendritic, D. D. Saratovkin (Review), 299.
Crystal-structure analysis, application of vector space, M. J. Buerger (Review), 298.
Curtis, G. H., 583. See Evernden, J. F.

D

Dachille, Frank, and Roy, Rustum, High pressure studies of the system $MgGeO_3$–$MgSiO_3$ with special reference to the olivine-spinel transition, 225.
Daniel, R. B., Entrenchment of the Willow Drainage Ditch, Harrison County, Iowa, 161.
Dapples, E. C., Basic geology for science and engineering (Review), 526.
Darrah, W. C., Principles of paleobotany, 2nd ed. (Review), 608.
Dates, mineral, distribution in time and space, Gordon Gastil, 1.
Davis, G. A., Lawsonite and pumpellyite in glaucophane schist, North Berkeley Hills, California, With notes on the X-ray crystallography of lawsonite, A. Pabst, 689.
Delevoryas, Theodore, reviews by, 608.
Dendritic crystallization, D. D. Saratovkin (Review), 299.
Dickson, F. W., 574. See Arntson, R. W.
Differentiation index, Chemistry of igneous rocks I, C. P. Thornton and O. F. Tuttle, 664.
Drainage, permafrost, and ice-pushed ridges, M. G. Rutten, 293.
Dunite and the tectonic environment, relationship between preferred orientation of olivine, M. H. Battey, 716.
Durham, J. W., review by, 153.

E

Ecology, marine, H. B. Moore (Review), 159.
Ekblaw, G. E., 185. See Frye, J. C.
Entrenchment of Willow Drainage Ditch, Harrison County, Iowa, R. B. Daniels, 161.
Equilibrium relations and compositional characteristics in mineral assemblages of a metamorphosed iron formation, R. F. Mueller, 449.
Evernden, J. F., Curtis, G. H., Kistler, R. W., and Obradovich, J., Argon diffusion in glauconite, microcline, sanidine, leucite and phlogopite, 583.

Ewing, Maurice, 429. See Broecker, W. S.

F

Fairbridge, R. W., review by, 158.
Fenton, C. L., and Fenton, M. A., The fossil book: a record of prehistoric times (Review), 79.
Fenton, M. A. (Review), 79. See Fenton, C. L.
Flint, R. F., review by, 157.
Fluvial deposits, effect of sediment type on shape and stratification, S. A. Schumm, 177.
Fold, petrofabric analysis, T. K. Ball, 274.
Folded veins, ptygmatically, relationships between length of arc and thickness, Hans Ramberg, 36.
Fossil book, record of prehistoric times, C. L. Fenton and M. A. Fenton (Review), 79.
Fresh- and salt water relationships in two terminal bars, J. P. Heath, 605.
Frye, J. C., Shaffer, P. R., Willman, H. B., and G. E. Ekblaw, Accretion-gley and the gumbotil dilemma, 185.

G

Garrels, R. M., Thompson, M. E., and Siever, R., Stability of some carbonates at 25°C and one atmosphere total pressure, 402.
Gastil, Gordon, The distribution of mineral dates in time and space, 1.
Geochemistry, principles, 2nd ed., Brian Mason (Review), 80.
Geological map of Connecticut, preliminary, explanatory text, John Rodgers (Review), 155.
Geology, basic, for science and engineering, E. C. Dapples (Review), 526.
Géologie de l'uranium, Marcel Roubault (Review), 156.
historical, introduction, R. C. Moore (Review), 153.
mathematical methods, A. E. Scheidegger, 218.
subsurface, in petroleum exploration, J. D. Haun and L. W. LeRoy, editors (Review), 157.
Geometrical considerations. Experimental investigation of silicate systems containing two volatile components, part I, P. J. Wyllie and O. F. Tuttle, 498.
Geomorphology, Cours de géomorphologie, André Cailleux and Jean Tricart (Review), 158.
Glaciation, Pleistocene, Trinity Alps, northern Calif., R. P. Sharp, 305.
Glauconite, microcline, sanidine, leucite, and phlogopite, argon diffusion in, J. F. Evernden and others, 583.
Glaucophane schist, North Berkeley Hills, Calif., lawsonite and pumpellyite, G. A. Davis, 689.
schists and jadeite-rocks from Angel Island, Calif., T. W. Bloxam, 555.
Gley (accretion) and the gumbotil dilemma, J. C. Frye and others, 185.
Goldsmith, Richard, A post-Harbor Hill-Charlestown moraine in southeastern Connecticut, 740.
Gower, J. A., X-ray measurement of the iron-magnesium ratio in biotites (Communication), 298.
Gregory, J. T., review by, 300.
Grossularite and hydrogrossularite, stability relations at high temperatures and pressures, C. W. F. T. Pistorious and G. C. Kennedy, 247.
Guilcher, André, Coastal and submarine morphology (Review), 223.
Gumbotil dilemma, and accretion-gley, J. C. Frye and others, 185.

H

Hahn, W. C., Jr., and Muan, Arnulf, Studies in the system Mn–O: The Mn_2O_3–Mn_3O_4 and Mn_2O_3–MnO equilibria, 66.
Haun, J. D., and LeRoy, L. W., editors, Subsurface geology in petroleum exploration (Review), 157.
Hay, R. L., Rate of clay formation and mineral alteration in a 4000-year-old volcanic ash soil on St. Vincent, B.W.I., 354.
Heath, J. P., Repeated avalanches at Chaos Jumbles, Lassen Volcanic National Park, 744.
Salt- and fresh water relationships in two terminal stream bars, 605.
Heezen, B. C., 429. See Broecker, W. S.
Hemley, J. J., Some mineralogical equilibria in the system K_2O–Al_2O_3–SiO_2–H_2O (Communication), 153.
Herzog, L. F., Pinson, W. H., Jr., and Hurley, P. M., Rb-Sr analyses and age determinations of certain lepidolites, including an international interlaboratory comparison suite, 191.
Historical geology, introduction, R. C. Moore (Review), 153.
Hurlbut, C. S., Dana's manual of mineralogy, 17th ed. (Review), 685.
Hurley, P. M., 191. See Herzog, L. F.
Hydrogrossularite and grossularite, stability relations at high temperatures and pressures, C. W. F. T. Pistorius and G. C. Kennedy, 247.

I

Igneous rocks, chemistry, I, differentiation index, C. P. Thornton and O. F. Tuttle, 664.

—, Si-Al relation in clinopyroxenes from, Ikuo Kushiro, 548.
Iowa, entrenchment of Willow Drainage Ditch, Harrison County, R. B. Daniels, 161.
Iron formation, metamorphosed, compositional characteristics and equilibrium relations in mineral assemblages, R. F. Mueller, 449.
magnesium ratio in biotites, X-ray measurement, J. A. Gower (Communication), 298.

J

Jadeite-rocks and glaucophane-schists from Angel Island, Calif., T. W. Bloxam, 555.
Sanbagawa crystalline schists of central Japan, Yotaro Seki, 705.
Japan, boundary between Lower and Upper Carboniferous, Masao Minato, 637.
jadeite in Sanbagawa crystalline schists, Yotaro Seki, 705.
mineralogical study on clays, Toshio Sudo (Review), 687.
Jensen, M. L., review by, 156.

K

Kennedy, G. C., 247. See Pistorius, C. W. F. T.
Kistler, R. W., 583. See Evernden, J. F.
Knowledge, personal, Michael Polanyi (Review), 384.
Kupsch, W. O., Radiocarbon-dated organic sediment near Herbert, Saskatchewan, 282.
Kushiro, Ikuo, Si-Al relation in clinopyroxenes from igneous rocks, 548.

L

Langenheim, R. L., Jr., 258. See Churkin, Michael, Jr.
Late-glacial and postglacial plant macrofossils from Gillis Lake, Richmond County, Nova Scotia, W. B. Schofield and H. Robinson, 518.
Lattice constants, Regression of physical properties on the compositions of clinopyroxenes I., Horace Winchell and Robert Tilling, 529.
Lawsonite and pumpellyite in glaucophane schist, North Berkeley Hills, California, G. A. Davis, 689.
X-ray crystallography, A. Pabst, 689.
LeComte, Paul, 209. See Birch, Francis.
Lepidolites, Rb-Sr analyses and age determinations, L. F. Herzog, W. H. Pinson, Jr., and P. M. Hurley, 191.
LeRoy, L. W., 157. See Haun, J. D.
Leucite, phlogopite, glauconite, microcline, and sanidine, argon diffusion in, F. W. Evernden and others, 583.
Longwell, C. R., review by, 155.
Lundqvist, G., Description to accompany the map of the Quaternary deposits of Sweden (Review), 157.
Lutz, H. J., Movement of rocks by uprooting of forest trees, 752.

M

Mackin, J. H., Structural significance of Tertiary volcanic rocks in southwestern Utah, 81.
Macrofossils, plant, late-glacial and postglacial, Gillis Lake, Richmond County, Nova Scotia, W. B. Schofield and H. Robinson, 518.
Magnesium germanate, High pressure studies of system Mg_2GeO_4–Mg_2SiO_4, Frank Dachille and Rustum Roy, 225.
-iron ratio in biotites, X-ray measurement, J. A. Gower (Communication), 298.
orthosilicate, High pressure studies of system Mg_2GeO_4–Mg_2SiO_4, Frank Dachille and Rustum Roy, 225.
Mallory, V. S., Lower Tertiary biostratigraphy of the California Coast ranges (Review), 300.
Manganese, System Mn–O, the Mn_2O_3–Mn_3O_4 and Mn_2O_3–MnO equilibria, W. C. Hahn, Jr. and Arnulf Muan, 65.
Map, preliminary geological of Connecticut, explanatory text, John Rodgers (Review), 155.
Quaternary deposits of Sweden, G. Lundqvist (Review), 157.
Margenau, Henry, reviews by, 301, 384, 528.
Marine ecology, H. B. Moore (Review), 159.
Massey, H. S. W., and Boyd, R. L. F., The upper atmosphere (Review), 528.
Mason, Brian, Principles of geochemistry, 2nd ed. (Review), 80.
685. See Berry, L. G.
Mathematical methods in geology, A. E. Scheidegger, 218.
McLaren, I. A., On the origin of the Caspian and Baikal seals and the paleoclimatological implication, 47.
McTaggart, K. C., The mobility of nuées ardentes, 369.
Microcline, sanidine, leucite, phlogopite, and glauconite, argon diffusion in, J. F. Evernden and others, 583.
Minato, Masao, The boundary between the Lower and Upper Carboniferous in Japan, 637.

Mineral alteration and clay formation in a 4000-year-old volcanic ash soil, St. Vincent, B. W. I., R. L. Hay, 354.
assemblages of a metamorphosed iron formation, compositional characteristics and equilibrium relations, R. F. Mueller, 449.
dates, distribution in time and space, Gordon Gastil, 1.
resources, elementary textbook in economic geology, C. M. Riley (Review), 687.
Mineralogical equilibria in the system K_2O–Al_2O_3–SiO_2–H_2O, J. J. Hemley (Communication), 153.
study on clays of Japan, Toshio Sudo (Review), 687.
Mineralogy, Dana's manual, 17th ed., C. S. Hurlbut (Review), 685.
L. G. Berry and Brian Mason (Review), 685.
Mintzer, David, review by, 527.
Molecular diffusion rates in supercritical water vapor estimated from viscosity data, Matt Walton, 385.
Montgomery, Arthur, reviews by, 685.
Moore, H. B., Marine ecology (Review), 159.
Moore, R. C., Introduction to historical geology (Review), 153.
Moraine, post-Harbor Hill-Charlestown, southeastern Conn., Richard Goldsmith, 740.
Morgan, Jeanne, The morphology and anatomy of American species of the genus Psaronius (Review), 608.
Morphology and anatomy of American species of genus Psaronius, Jeanne Morgan (Review), 608.
coastal and submarine, André Guilcher (Review), 223.
Movement of rocks by uprooting of forest trees, H. J. Lutz, 752.
Muan, Arnulf, 66. See Hahn, W. C., Jr.
Mueller, R. F., Compositional characteristics and equilibrium relations in mineral assemblages of a metamorphosed iron formation, 449.
Murata, K. J., Occurrence of CuCl emission in volcanic flames, 769.

N

Near East, Quaternary stratigraphy and climate, K. W. Butzer (Review), 222.
Nova Scotia, late-glacial and postglacial plant macrofossils from Gillis Lake, Richmond County, W. B. Schofield and H. Robinson, 518.
recurrence surfaces and pollen stratigraphy of a postglacial raised bog, J. G. Ogden III, 341.
Nuées ardentes, mobility, K. C. McTaggart, 369.

O

Obradovich, J., 583. See Evernden, J. F.
Officer, C. B., Introduction to the theory of sound transmission (Review), 527.
Ogden, J. G. III, Recurrence surfaces and pollen stratigraphy of a postglacial raised bog, Kings County, Nova Scotia, 341.
Olivine, preferred orientation in dunite, M. H. Battey, 716.
Olivine-spinel transition, high pressure studies of system Mg_2GeO_4–Mg_2SiO_4, Frank Dachille and Rustum Roy, 225.
Ordovician, Lower, Chipman formation, west-central Vermont, stratigraphic relationships, W. M. Cady and E-an Zen, 728.
Orientation of olivine in dunite and the tectonic environment, M. H. Battey, 716.
Oxygen, System Mn–O, the Mn_2O_3–Mn_3O_4–MnO equilibria, W. C. Hahn, Jr., and Arnulf Muan, 66.

P

Pabst, A., Notes on the X-ray crystallography of lawsonite, 689. See Davis, G. A.
Paleobotany, principles, 2nd ed., W. C. Darrah (Review), 608.
Paleoclimatological implication, origin of Caspian and Baikal seals, I. A. McLaren, 47.
Permafrost, drainage, and ice-pushed ridges, M. G. Rutten, 293.
Petrofabric analysis of a fold, T. K. Ball, 274.
Petroleum exploration, subsurface geology, J. D. Haun and L. W. LeRoy, editors (Review), 157.
Phenocryst composition of volcanic rocks, stained slice method for rapid determination, P. L. Williams, 148.
Phlogopite, glauconite, microcline, sanidine, and leucite, argon diffusion in, F. W. Evernden and others, 583.
Physical properties, regression on compositions of clinopyroxenes. I. Lattice constants, Horace Winchell and Robert Tilling, 529.
Physics, great experiments, M. H. Shamos, editor (Review), 383.
plasma, basic data, S. C. Brown (Review), 301.
Pinson, W. H., Jr., 191. See Herzog, L. F.
Pistorius, C. W. F. T., and Kennedy, G. C., Stability relations of grossularite and hydrogrossularite at high temperatures and pressures, 247.

and Sharp, W. E., Properties of water. Part VI. Entropy and Gibbs free energy of water in the range 10-1000°C and 1-250,000 bars, 757.
Plant macrofossils, late-glacial and postglacial, Gillis Lake, Richmond County, Nova Scotia, W. B. Schofield and H. Robinson, 518.
Plasma physics, basic data, S. C. Brown (Review), 301.
Pleistocene glaciation in the Trinity Alps, northern Calif., R. P. Sharp, 305.
Polanyi, Michael, Personal knowledge (Review), 384.
Pollen stratigraphy and recurrence surfaces of a postglacial raised bog, Kings County, Nova Scotia, J. G. Ogden III, 341.
Polysulfide and thiosulfate solutions, systems S–Na_2O–H_2O and S–H_2O, R. W. Arntson, F. W. Dickson, and George Tunell, 574.
Postglacial and late-glacial plant macrofossils, Gillis Lake, Richmond County, Nova Scotia, W. B. Schofield and H. Robinson, 518.
raised bog, Kings County, Nova Scotia, recurrence surfaces and pollen stratigraphy, J. G. Ogden III, 341.
Potassium oxide, Mineralogical equilibria in the system K_2O–Al_2O_3–SiO_2–H_2O, J. J. Hemley (Communication), 153.
Powers, R. W., review by, 157.
Pressure, high, studies of system Mg_2GeO_4–Mg_2SiO_4, Frank Dachille and Rustum Roy, 225.
one atmosphere total, stability of carbonates at 25°C, R. M. Garrels, M. E. Thompson, and R. Siever, 402.
-temperature plane for albite composition, Francis Birch and Paul LeComte, 209.
Pressures and temperatures, high, stability relations of grossularite and hydrogrossularite, C. W. F. T. Pistorius and G. C. Kennedy, 247.
Price, D. J. de S., review by, 383.
Ptygmatically folded veins, relationships between length of arc and thickness, Hans Ramberg, 36.
Publications recently received, 80, 160, 224, 302, 528.
Pumpellyite and lawsonite in glaucophane schist, North Berkeley Hills, Calif., G. A. Davis, 689.

Q

Quaternary deposits of Sweden, map, G. Lundqvist (Review), 157.
stratigraphy and climate in the Near East, K. W. Butzer (Review), 222.

R

Radiocarbon-dated organic sediment near Herbert, Saskatchewan, W. O. Kupsch, 282.
Ramberg, Hans, Relationships between length of arc and thickness of ptygmatically folded veins, 36.
Recurrence surfaces and pollen stratigraphy of a raised bog, Kings County, Nova Scotia, J. G. Ogden III, 341.
Relativity, Kritik und Fortbildung der Relativitätstheorie, Karl Sapper, editor (Review), 222.
Ridges, ice-pushed, permafrost and drainage, M. G. Rutten, 293.
Riley, C. M., Our mineral resources, an elementary textbook in economic geology (Review), 687.
Robinson, H., 518. See Schofield, W. B.
Rocks, charnockitic, Santa Lucia Range, Calif., R. R. Compton, 609.
igneous, chemistry, I, Differentiation index, C. P. Thornton and O. F. Tuttle, 664.
—, igneous, Si-Al relation in clinopyroxenes, Ikuo Kushiro, 548.
movement by uprooting of forest trees, H. J. Lutz, 752.
Tertiary volcanic, southwestern Utah, J. H. Mackin, 81.
volcanic, stained slice method for rapid determination of phenocryst composition, P. L. Williams, 148.
Rodgers, John, Explanatory text for preliminary geological map of Connecticut (Review), 155.
Roubault, Marcel, Géologie de l'uranium (Review), 156.
Roy, D. M., 132. See Buckner, D. A.
Roy, Rustum, 132. See Buckner, D. A. 225. See Dachille, Frank.
Rubidium, Rb-Sr analyses and age determinations of certain lepidolites, L. F. Herzog, W. H. Pinson, Jr., and P. M. Hurley, 191.
Russia, origin of the Caspian and Baikal seals and the paleoclimatological implication, I. A. McLaren, 47.
Rutten, M. G., Ice-pushed ridges, permafrost and drainage, 293.

S

Salisbury, Lynne, review by, 80.
Salt- and fresh water relationships in two terminal bars, J. P. Heath, 605.
Sanidine, leucite, phlogopite, glauconite, and microcline, argon diffusion in, F. W. Evernden and others, 583.
Sapper, Karl, editor, Kritik und Fortbildung der Relativitätstheorie (Review), 222.
Saratovkin, D. D., Dendritic crystallization (Review), 299.

Saskatchewan, radiocarbon-dated organic sediment near Herbert, W. O. Kupsch, 282.
Scheidegger, A. E., Mathematical methods in geology, 218.
Schofield, W. B., and Robinson, H., Late-glacial and postglacial plant macrofossils from Gillis Lake, Richmond County, Nova Scotia, 518.
Schumm, S. A., The effect of sediment type on the shape and stratification of some modern fluvial deposits, 177.
Seals, Caspian and Baikal, origin and paleoclimatological implication, I. A. McLaren, 47.
Sediment, organic, radiocarbon-dated, near Herbert, Saskatchewan, W. O. Kupsch, 282.
type, effect on shape and stratification of modern fluvial deposits, S. A. Schumm, 177.
Seki, Yotaro, Jadeite in Sanbagawa crystalline schists of central Japan, 705.
Shaffer, P. R., 185. See Frye, J. C.
Shamos, M. H., editor, Great experiments in physics (Review), 383.
Sharp, R. P., Pleistocene glaciation in the Trinity Alps of northern California, 305.
Sharp, W. E., 757. See Pistorius, C. W. F. T.
Siever, R., 402. See Garrels, R. M.
Silicate systems containing two volatile components, experimental investigation, Part I, Geometrical considerations, P. J. Wyllie and O. F. Tuttle, 498.
Silicon, Si-Al relation in clinopyroxenes from igneous rocks, Ikuo Kushiro, 548.
dioxide, Mineralogical equilibria in the system K_2O–Al_2O_3–SiO_2–H_2O, J. J. Hemley (Communication), 153.
—, System CaO–Al_2O_3–SiO_2–H_2O, II. System $CaSiO_3$–H_2O, D. A. Buckner, D. M. Roy, and Rustum Roy, 132.
Silurian strata of the Klamath Mountains, Calif., Michael Churkin, Jr. and R. L. Langenheim, Jr., 258.
Sodium oxide, Systems S–Na_2O–H_2O and S–H_2O, R. W. Arntson, F. W. Dickson, and George Tunell, 574.
Soil, 4000-year-old volcanic ash, St. Vincent, B. W. I., rate of clay formation and mineral alteration, R. L. Hay, 354.
Soils for the archaeologist, I. W. Cornwall (Review), 524.
Sound transmission, introduction to theory, C. B. Officer (Review), 527.
Space, and time, distribution of mineral dates, Gordon Gastil, 1.
Spinel-olivine transition, high pressure studies of system Mg_2GeO_4–Mg_2SiO_4, Frank Dachille and Rustum Roy, 225.
Stability relations of grossularite and hydrogrossularite at high temperatures and pressures, C. W. F. T. Pistorius and G. C. Kennedy, 247.
Stained slice method for rapid determination of phenocryst composition of volcanic rocks, R. L. Williams, 148.
Strata, Silurian, of Klamath Mountains, Calif., Michael Churkin, Jr. and R. L. Langenheim, Jr., 258.
Stratification of modern fluvial deposits, effect of sediment type, S. A. Schumm, 177.
Stratigraphic relationships of Lower Ordovician Chipman formation in west-central Vermont, W. M. Cady and E-an Zen, 728.
Stratigraphy, pollen, and recurrence surfaces of postglacial raised bog, Kings County, Nova Scotia, J. G. Ogden III, 341.
Quaternary, and climate in Near East, K. W. Butzer (Review), 222.
Stream bars, terminal, salt- and fresh water relationships, J. P. Heath, 605.
Strontium, Rb-Sr analyses and age determinations of certain lepidolites, L. F. Herzog, W. H. Pinson, Jr., and P. M. Hurley, 191.
Structural significance of Tertiary volcanic rocks in southwestern Utah, J. H. Mackin, 81.
Submarine, and coastal, morphology, André Guilcher (Review), 223.
Sudo, Toshio, Mineralogical study on clays of Japan (Review), 687.
Sulfur, Systems S–Na_2O–H_2O and S–H_2O, R. W. Arntson, F. W. Dickson, and George Tunell, 574.
Sweden, map of Quaternary deposits, G. Lundqvist (Review), 157.
System CaO–Al_2O_3–SiO_2–H_2O, studies, II. System $CaSiO_3$–H_2O, D. A. Buckner, D. M. Roy, and Rustum Roy, 132.
K_2O–Al_2O_3–SiO_2–H_2O, mineralogical equilibria, J. J. Hemley (Communication), 153.
Mg_2GeO_4–Mg_2SiO_4, high pressure studies, Frank Dachille and Rustum Roy, 225.
Mn–O, the Mn_2O_3–Mn_3O_4 and Mn_3O_4–MnO equilibria, W. C. Hahn, Jr. and Arnulf Muan, 65.
S–Na_2O–H_2O and S–H_2O: application to the mode of origin of natural alkaline polysulfide and thiosulfate solutions, R. W. Arntson, F. W. Dickson, and George Tunell, 574.

silicate, containing two volatile components, experimental investigation. Part I, Geometrical considerations, P. J. Wyllie and O. F. Tuttle, 498.

T

Temperature-pressure plane for albite composition, Francis Birch and Paul LeComte, 209.
Temperatures and presures, high, stability relations of grossularite and hydrogrossularite, C. W. F. T. Pistorius and G. C. Kennedy, 247.
Tertiary, lower, biostratigraphy of California Coast ranges, V. S. Mallory (Review), 300.
volcanic rocks in southwestern Utah, structural significance, J. H. Mackin, 81.
Thiosulfate and polysulfide solutions, systems S–Na_2O–H_2O and S–H_2O, R. W. Arntson, F. W. Dickson, and George Tunell, 574.
Thompson, E. F., review by, 159.
Thompson, M. E., 402. See Garrels, R. M.
Thornton, C. P., and Tuttle, O. F., Chemistry of igneous rocks I. Differentiation index, 664.
Tilling, Robert, 529. See Winchell, Horace.
Time and space, distribution of mineral dates, Gordon Gastil, 1.
Tricart, Jean, 158. See Cailleux, André.
Tunell, George, 574.
Tuttle, O. F., 498. See Wyllie, P. J.
664. See Thornton, C. P.

U

Uprooting of forest trees, movement of rocks, H. P. Lutz, 752.
Uranium, Géologie de l'uranium, Marcel Roubault (Review), 156.
Utah, southwestern, structural significance of Tertiary volcanic rocks, J. H. Mackin, 81.

V

Vector space and its application in crystal-structure analysis, M. J. Buerger (Review), 298.
Veins, ptygmatically folded, relationships between length of arc and thickness, Hans Ramberg, 36.
Vermont, stratigraphic relationships of the Lower Ordovician Chipman formation, W. M. Cady and E-an Zen, 728.
Viscosity data, molecular diffusion rates estimated in supercritical water vapor, Matt Walton, 385.
Volatile components in silicate systems. Part I, Geometrical considerations, P. J. Wyllie and O. F. Tuttle, 498.
Volcanic ash soil, 4000 years old, St. Vincent, B. W. I., rate of clay formation and mineral alteration, R. L. Hay, 354.
flames, occurrence of CuCl emission, K. J. Murata, 769.
rocks, stained slice method for rapid determination of phenocryst composition, P. O. Williams, 148.
—, Tertiary, in southwestern Utah, structural significance, J. H. Mackin, 81.

W

Walton, Matt, Molecular diffusion rates in supercritical water vapor estimated from viscosity data, 385.
Water, Mineralogical equilibria in the system K_2O–Al_2O_3–SiO_2–H_2O, J. J. Hemley (Communication), 153.
properties. VI. Entropy and Gibbs free energy of water in range 10-1000°C and 1-250,000 bars, C. W. F. T. Pistorius and W. E. Sharp, 757.
System CaO–Al_2O_3–SiO_2–H_2O, II. System $CaSiO_3$–H_2O, D. A. Buckner, D. M. Roy, and Rustum Roy, 132.
—, S–Na_2O–H_2O and S–H_2O, R. W. Arntson, F. W. Dickson, and George Tunell, 574.
vapor, molecular diffusion rates estimated from viscosity data, Matt Walton, 385.
Williams, P. L., A stained slice method for rapid determination of phenocryst composition of volcanic rocks, 148.
Willman, H. B., 185. See Frye, J. C.
Winchell, Horace, and Tilling, Robert, Regressions of physical properties on the compositions of clinopyroxenes. I, Lattice constants, 529.
reviews by, 299, 687.
Wyllie, P. J., and Tuttle, O. F., Experimental investigation of silicate systems containing two volatile components. Part I. Geometrical considerations, 498.

X

X-ray crystallography of lawsonite, A. Pabst, 689.
measurement of the iron-magnesium ratio in biotites, J. A. Gower (Communication), 298.

Z

Zen, E-an, 728. See Cady, W. M.

American Journal of Science

Established in 1818 by Benjamin Silliman

EDITORS

JOHN RODGERS—JOSEPH T. GREGORY

ASSOCIATE EDITORS

GEORGE GAYLORD SIMPSON, CAMBRIDGE, MASS.
A. F. BUDDINGTON, PRINCETON, N. J.
CARL O. DUNBAR
MATT WALTON
HENRY MARGENAU
RICHARD F. FLINT
HORACE WINCHELL
HAROLD G. CASSIDY
EDWARD S. DEEVEY, JR.
G. EVELYN HUTCHINSON, NEW HAVEN, CONN.
WILMOT H. BRADLEY
PHILIP H. ABELSON, WASHINGTON, D. C.
LEASON H. ADAMS, LOS ANGELES, CALIF.
HOWEL WILLIAMS, BERKELEY, CALIF.
C. R. LONGWELL, PALO ALTO, CALIF.
ADOLPH KNOPF, STANFORD, CALIF.
FREDERICK J. ALCOCK, OTTAWA, CANADA
CECIL E. TILLEY, CAMBRIDGE, ENGLAND

VOL. 258

NEW HAVEN, CONNECTICUT

1960

CONTENTS TO VOLUME 258

NUMBER 1

The Distribution of Mineral Dates in Time and Space .....*Gordon Gastil* 1

Relationships Between Length of Arc and Thickness of Ptygmatically Folded Veins .....*Hans Ramberg* 36

On the Origin of the Caspian and Baikal Seals and the Paleoclimatological Implication .....*I. A. McLaren* 47

Studies in the System Mn–O: The Mn_2O_3–Mn_3O_4 and Mn_3O_4–MnO Equilibria .....*W. C. Hahn, Jr. and Arnulf Muan* 66

REVIEWS

The Fossil Book: A Record of Prehistoric Times; by C. L. Fenton and M. A. Fenton *Lynne Salisbury* 79

Principles of Geochemistry, 2d ed; by Brian Mason .....*M. H. Carr* 80

PUBLICATIONS RECENTLY RECEIVED 80

NUMBER 2

Structural Significance of Tertiary Volcanic Rocks in Southwestern Utah
J. Hoover Mackin 81

Studies in the System $CaO—Al_2O_3—SiO_2—H_2O$, II: The System $CaSiO_3—H_2O$ .....*Dean A. Buckner, Della M. Roy and Rustum Roy* 132

A Stained Slice Method for Rapid Determination of Phenocryst Composition of Volcanic Rocks .....*Paul L. Williams* 148

COMMUNICATION

Some Mineralogical Equilibria in the System $K_2O—Al_2O_3—SiO_2—H_2O$
J. Julian Hemley 153

REVIEWS

Introduction to Historical Geology; by Raymond C. Moore .....*J. Wyatt Durham* 153

Explanatory Text for Preliminary Geological Map of Connecticut; by John Rodgers
Chester R. Longwell 155

Géologie de l'Uranium; by Marcel Roubault .....*Mead LeRoy Jensen* 156

Karta över Sveriges jordarter
Description to accompany the map of the Quaternary deposits of Sweden; by G. Lundqvist .....*R. F. Flint* 157

Subsurface Geology in Petroleum Exploration; edited by John D. Haun and L. W. LeRoy .....*R. W. Powers* 157

Cours de Géomorphologie; by André Cailleux and Jean Tricart
Rhodes W. Fairbridge 158

Marine Ecology; by Hilany B. Moore .....*E. F. Thompson* 159

PUBLICATIONS RECENTLY RECEIVED 160

NUMBER 3

Entrenchment of the Willow Drainage Ditch, Harrison County, Iowa
Raymond B. Daniels 161

The Effect of Sediment Type on the Shape and Stratification of Some Modern Fluvial Deposits ..... *S. A. Schumm* 177

Accretion-Gley and the Gumbotil Dilemma
J. C. Frye, P. R. Shaffer, H. B. Willman, and G. E. Ekblaw 185

Rb-Sr Analyses and Age Determinations of Certain Lepidolites, Including an International Interlaboratory Comparison Suite
L. F. Herzog, W. H. Pinson, Jr., and P. M. Hurley 191

Temperature-Pressure Plane for Albite Composition
Francis Birch and Paul LeComte 209

Mathematical Methods in Geology ..... *Adrian E. Scheidegger* 218

REVIEWS

Kritik und Fortbildung der Relativitätstheorie: edited by Karl Sapper
Henry Margenau 222

Quaternary Stratigraphy and Climate in the Near East: by K. W. Butzer
Paul S. Martin 222

Coastal and Submarine Morphology: by André Guilcher ..... *C. W. Carlston* 223

PUBLICATIONS RECENTLY RECEIVED 224

NUMBER 4

High Pressure Studies of the System $Mg_2GeO_4 - Mg_2SiO_4$ with Special Reference to the Olivine-Spinel Transition
Frank Dachille and Rustum Roy 225

Stability Relations of Grossularite and Hydrogrossularite at High Temperatures and Pressures
Carl W. F. T. Pistorius and George C. Kennedy 247

Silurian Strata of the Klamath Mountains, California
Michael Churkin, Jr. and Ralph L. Langenheim, Jr. 258

A Petrofabric Analysis of a Fold ..... *T. K. Ball* 274

Radiocarbon-Dated Organic Sediment near Herbert, Saskatchewan, Canada ..... *W. O. Kupsch* 282

Ice-Pushed Ridges, Permafrost and Drainage ..... *M. G. Rutten* 293

COMMUNICATION

X-Ray Measurement of the Iron-Magnesium Ratio in Biotites ..... *J. A. Gower* 298

REVIEWS

Vector Space and Its Application in Crystal-Structure Analysis; by Martin J. Buerger
C. L. Christ 298

Dendritic Crystallization; by D. D. Saratovkin ..... *Horace Winchell* 299

Lower Tertiary Biostratigraphy of the California Coast Ranges; by V. Standish Mallory ..... *Joseph T. Gregory* 300

Basic Data of Plasma Physics; by Sanford C. Brown ..... *Henry Margenau* 301

Publications Recently Received 302

Number 5

Pleistocene Glaciation in the Trinity Alps of Northern California
Robert P. Sharp 305

Recurrence Surfaces and Pollen Stratigraphy of a Postglacial Raised Bog, Kings County, Nova Scotia ..... *J. Gordon Ogden III* 341

Rate of Clay Formation and Mineral Alteration in a 4000-Year-Old Volcanic Ash Soil on St. Vincent, B.W.I. ..... *Richard L. Hay* 354

The Mobility of *Nuées Ardentes* ..... *K. C. McTaggart* 369

REVIEWS

Great Experiments in Physics; edited by Morris H. Shamos ..*Derek J. de Solla Price* 383

Personal Knowledge; by Michael Polanyi ..... *Henry Margenau* 384

Number 6

Molecular Diffusion Rates in Supercritical Water Vapor Estimated From Viscosity Data ..... *Matt Walton* 385

Stability of Some Carbonates at 25°C and One Atmosphere Total Pressure ..... *R. M. Garrels, M. E. Thompson, and R. Siever* 402

Classification of Arenites ..... *Keith A. W. Crook* 419

Evidence for an Abrupt Change in Climate Close to 11,000 Years Ago *Wallace S. Broecker, Maurice Ewing, and Bruce C. Heezen* 429

NUMBER 7

Compositional Characteristics and Equilibrium Relations in Mineral Assemblages of a Metamorphosed Iron Formation
Robert F. Mueller 449

Experimental Investigation of Silicate Systems Containing Two Volatile Components, Part I. Geometrical Considerations
P. J. Wyllie and O. F. Tuttle 498

Late-Glacial and Postglacial Plant Macrofossils from Gillis Lake, Richmond County, Nova Scotia, Canada
W. B. Schofield and H. Robinson 518

REVIEWS

Soils for the Archaeologist; by I. W. Cornwall .....*Ursula M. Cowgill* 524
Basic Geology for Science and Engineering; by E. C. Dapples .....*Arthur L. Bloom* 526
Introduction to the Theory of Sound Transmission; by C. B. Officer ....*David Mintzer* 527
The Upper Atmosphere; by H. S. W. Massey and R. L. F. Boyd ....*Henry Margenau* 528
PUBLICATIONS RECENTLY RECEIVED 528

NUMBER 8

Regressions of Physical Properties on the Compositions of Clinopyroxenes I. Lattice Constants .....*Horace Winchell and Robert Tilling* 529

Si-Al Relation in Clinopyroxenes from Igneous Rocks .....*Ikuo Kushiro* 548

Jadeite-rocks and Glaucophane-schists from Angel Island, San Francisco Bay, California .....*T. W. Bloxam* 555

Systems S—Na_2O—H_2O and S—H_2O: Application to the Mode of Origin of Natural Alkaline Polysulfide and Thiosulfate Solutions
R. W. Arntson, F. W. Dickson, and George Tunell 574

Argon Diffusion in Glauconite, Microcline, Sanidine, Leucite and Phlogopite
J. F. Evernden, G. H. Curtis, R. W. Kistler, and J. Obradovich 583

Salt- and Fresh Water Relationships in Two Terminal Stream Bars
James P. Heath 605

REVIEWS

The Morphology and Anatomy of American Species of the Genus Psaronius; by Jeanne Morgan .....*Theodore Delevoryas* 608

Principles of Paleobotany, 2nd ed.; by William C. Darrah .....*Theodore Delevoryas* 608

NUMBER 9

Charnocktic Rocks of Santa Lucia Range, California
Robert R. Compton 609

The Boundary Between the Lower and Upper Carboniferous in Japan
Masao Minato 637

Chemistry of Igneous Rocks I. Differentiation Index
C. P. Thornton and O. F. Tuttle 664

REVIEWS

Mineralogy (Concepts, Descriptions, Determinations); by L. G. Berry and Brian Mason

Dana's Manual of Mineralogy, 17th ed.; revised by Cornelius S. Hurlbut
Arthur Montgomery 685

Mineralogical Study on Clays of Japan; by Toshio Sudo .....*Horace Winchell* 687

Our Mineral Resources. An Elementary Textbook in Economic Geology; by Charles M. Riley .....*G. C. Amstutz* 687

NUMBER 10

Lawsonite and Pumpellyite in Glaucophane Schist, North Berkeley Hills, California ..... *Gregory A. Davis*. With Notes on the X-ray Crystallography of Lawsonite ..... *A. Pabst* 689

Jadeite in Sanbagawa Crystalline Schists of Central Japan ..*Yotaro Seki* 705

The Relationship between Preferred Orientation of Olivine in Dunite and the Tectonic Environment ..... *M. H. Battey* 716

Stratigraphic Relationships of the Lower Ordovician Chipman formation in West-central Vermont ..... *W. M. Cady and E-an Zen* 728

A Post-Harbor Hill-Charlestown Moraine in Southeastern Connecticut *Richard Goldsmith* 740

Repeated Avalanches at Chaos Jumbles, Lassen Volcanic National Park *James P. Heath* 744

Movement of Rocks by Uprooting of Forest Trees ..... *H. J. Lutz* 752

Properties of Water. Part VI. Entropy and Gibbs Free Energy of Water in the Range 10-1000°C and 1-250,000 Bars *Carl W. F. T. Pistorius and W. E. Sharp* 757

Occurrence of CuCl Emission in Volcanic Flames ..... *K. J. Murata* 769

INDEX TO VOLUME 258 773

CONTENTS, VOLUME 258